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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

PUBLICATIONS AND PATENTS
OF THE
EASTERN UTILIZATION RESEARCH BRANCH

July - December 1954

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867, 868, 872, 875, 877, 889

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Publications and patents of the Eastern Utilization Research Branch issued before 1951 are listed in AIC-180 and Supplements 1 to 6; publications and patents from 1951 through June 1954 are listed in AIC-320 and Supplements 1 to 6.

This list includes an index which covers AIC-180 and supplements and AIC-320 and supplements.



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Publications

- 860 Ault, Waldo C.
INEDIBLE FATS AND FATTY ACIDS. HISTORY AND TECHNOLOGICAL TRENDS. Journal of the American Oil Chemists Society, vol. 31, p. 486-489, November 1954. Significant developments in the production and processing of inedible fats and oils are reviewed. Certain trends are called to attention and probable future directions of development are forecast. The increasing significance of research to further growth of the industry is emphasized.
- 861 Ault, Waldo C. and Riemenschneider, R. W.
ANIMAL FATS IN LIVESTOCK FEEDS. Chemurgic Digest, vol. 13, no. 11, p. 4-5, 19, December 1954.
Progress on development of a substantial new market outlet for inedible animal fats in livestock feeds is described. The advantages of such use for fats are discussed and data showing the economic basis for this use are presented.
- 862 Beebe, C. W., Happich, W. F., Kip, W. S. and Rogers, J. S.
ALUM RETANNAGE OF VEGETABLE-TANNED INSOLES IMPROVES THEIR SERVICEABILITY. Journal of the American Leather Chemists Association, vol. 49, p. 630-639, September 1954.
A report on the evaluation of commercially-tanned vegetable and alum-retanned insole leathers by laboratory and actual shoe wear service tests shows that alum retannage increases serviceability about 70% above that given by vegetable-tanned leathers.
- 863 Brice, B. A.
THE MEASUREMENT AND SPECIFICATION OF COLOR. Color in Foods, p. 4-12, November 1954. Advisory Board on Quartermaster Research, National Research Council, Washington, D. C.
The measurement and specification of color by means of the C.I.E. coordinate system and standard observer is described. The application of this fundamental system, and some more rapid abridged methods, to the evaluation of color in food products is illustrated.
- 864 Clarke, I. D. and Flaharty, R. M.
AN INSOLE LEATHER TESTER. Journal of the American Leather Chemists Association, vol. 49, p. 624-629, September 1954.
A machine for flexing leather under pressure is described

- 865 Cording, James, Jr., Willard, Miles J., Jr., Eskew, Roderick K. and Edwards, Paul W.

POTATO FLAKES. A NEW FORM OF DEHYDRATED MASHED POTATOES I. PILOT-PLANT PROCESS USING DOUBLE DRUM DRIER. ARS-73-2, November 1954. (Processed). Describes a new process for making dehydrated mashed potatoes on double drum driers of the type readily available commercially. It is a single stage drying process, yielding a product of as low as 3% moisture content. The product is made in the form of thin flakes which rehydrate quickly to yield a mashed potato of excellent color, flavor and texture. Process variables, which determine the quality of the mash the flake will yield on rehydration, can be easily controlled. Aside from its probable low cost, the most important attribute of the product is its excellent tolerance for rehydrating liquids over a wide temperature range. Potato flakes rehydrate rapidly with liquid from about 50 to 160° F. and yield a product of excellent texture. Recent tests show that a product capable of being reconstituted with boiling liquid can be made by controlled dilution of mash before drying.

- 866 Eddy, C. Roland and Eisner, Abner

INFRARED SPECTRA OF NICOTINE AND SOME OF ITS DERIVATIVES. Analytical Chemistry, vol. 26, p. 1428-1431, September 1954.

Ultraviolet spectrophotometry has been used for the identification and characterization of tobacco alkaloids and related substances, but the ultraviolet spectra are not able to distinguish among alkaloids having equivalent degrees of conjugated unsaturation.

Infrared spectra are presented in this paper for nicotine and five related alkaloids.

These spectra are quite different for compounds having identical ultraviolet curves. Rapid and unambiguous identification of any one of these alkaloids is possible by comparison of the spectrum of an unknown with these infrared curves. From the absence of an N-H stretching vibration in the spectrum of myosmine, it is suggested that the accepted structure of this alkaloid is incorrect.

- 867 Eskew, Roderick K.

RECENT DEVELOPMENTS IN THE RECOVERY OF VOLATILE FRUIT CONCENTRATES. Proceedings of the 44th Annual Meeting of the Flavoring Extract Manufacturers' Association of the United States, p. 69-73, May 11-13, 1953.

This is a review of the development at the Eastern Laboratory of the process for volatile flavor recovery with emphasis on recent developments which have greatly expanded the utility of the original equipment.

- 868 Evans, John D. (Temple University), Riemenschneider, R. W. and Herb, S. F. (EURB)

FAT COMPOSITION AND *IN VITRO* OXYGEN CONSUMPTION OF MARROW FROM FED AND FASTED RABBITS. Archives of Biochemistry and Biophysics, vol. 53, p. 157-166, November 1954.

Spectrophotometric fatty acid analyses of marrow fat from six fed and six fasted rabbits were compared in relation to their respective *in vitro* oxygen consumptions.

- 869 Halwer, Murray
LIGHT-SCATTERING STUDY OF EFFECT OF ELECTROLYTES ON α - and β -CASEIN SOLUTIONS.
Archives of Biochemistry and Biophysics, vol. 51, p. 79-87, July 1954.
It is shown that addition of electrolytes to solutions of α - and β -casein brings about aggregation. This behavior, taken in conjunction with other properties, indicates that the caseins have the properties of denatured proteins. Aggregation complicates the determination of the molecular weights of these substances. Values in which confidence can be felt probably do not exist at present.
- 870 Hansen, John E. and Palm, William E.
PROPERTIES OF LACTOPRENE BN-12.5, A COPOLYMER OF BUTYL ACRYLATE AND ACRYLONITRILE AND ITS VULCANIZATES. Rubber Age. vol. 75, p. 677-687, August 1954.
The properties of a new synthetic rubber, Lactoprene BN-12.5, a monomer mixture of 87.5% butyl acrylate and 12.5% acrylonitrile are described in detail, and compared with those of several commercial rubbers. The new rubber has outstanding resistance to heat and lubricating oils. Brittle points are lower and water resistance higher than for Lactoprene EV.
- 871 Happich, M. L., Beebe, C. W. and Rogers, J. S.
TANNIN EVALUATION OF ONE HUNDRED SIXTY-THREE SPECIES OF PLANTS. Journal of the American Leather Chemists Association, vol. 49, p. 760-773, December 1954.
A report on the tannin evaluation of 163 species of plants from 2,000 collections now being studied as cortisone precursors.
- 872 Highlands, M. E., Licciardello, J. J. (Univ. of Maine Agric. Exp. Sta.) and Herb, S. F. (EURB)
OBSERVATIONS ON THE LIPID CONSTITUENTS OF WHITE POTATOES. American Potato Journal, vol. 31, p. 353-357, November 1954.
The fatty acid composition of potato lipids was studied. Linoleic and linolenic acids are present in substantial proportions suggesting that the "off" flavor developed in dehydrated potatoes on prolonged storage results in part from the oxidative rancidity of the lipid material. Accelerated stability tests conducted on the potato lipid tended to support this view.
- 873 Hipp, N. J., Groves, M. L., and McMeekin, T. L.
TENSILE PROPERTIES OF BRISTLE FIBERS MADE FROM α - and β -CASEIN. Textile Research Journal, vol. 24, p. 618-623, July 1954.
The tensile properties of fibers made from α - and β -casein and unfractionated casein have been compared. β -casein fiber, oriented by stretching, was considerably better than the other casein fibers, and values for its wet and dry tenacity compared favorably with corresponding values for wool. The better fiber properties of β -casein are ascribed to its molecular structure.
- 874 Knight, H. B. and Swern, Daniel
TETRALIN HYDROPEROXIDE. Organic Syntheses, vol. 34, p. 90-93, October 1954. John Wiley and Sons, Inc., New York.
The preparation of tetralin hydroperoxide by oxidation of pure tetralin with oxygen is described.

- 875 Krewson, C. F., Neufeld, C. H. H., Drake, T. F. and Fontaine, T. D.
SYNTHETIC PLANT-GROWTH MODIFIERS. IV. 2-METHYL-4-CHLOROPHENOXYACETYL DERIVATIVES OF AMINO ACIDS. Weeds, vol. III, p. 28-37, January 1954.
A series of new 2-methyl-4-chlorophenoxyacetyl derivatives of *D*-, *L*-, and *DL*-amino acids was prepared, and the compounds were tested for plant-growth modifying activity.
- In general, the derivatives of *DL*- and *L*-amino acids were active as plant-growth modifiers when tested on 6 different plants; those of *D*-amino acids were less active. The *D*-leucine and *D*-phenylalanine derivatives were inactive over the 2-week test period. Results varied in degree but were in close agreement with those previously reported for the behavior of some corresponding 2,4-dichlorophenoxyacetyl amino acids. The individual *D*-amino acid derivatives, exhibited a high degree of specificity and a wide variety and degree of activity relative to various plant responses.
- 876 Krider, Merle M., Cordon, Theone C. and Wall, Monroe E.
STEROIDAL SAPOGENINS. XVI. HYDROLYSIS OF 5-ALPHA, 22a-SPIROSTANE GLYCOSIDES BY FUNGAL SAPONASES. Journal of the American Chemical Society, vol. 76, p. 3515-3517, July 5, 1954.
Certain microorganisms, especially those of the genera *Aspergillus* and *Penicillium*, when grown in a medium containing steroidal saponins with 5 α , 22a-spirosterane aglycones adaptatively produce enzymes which cleave the saponins to sapogenins. The sapogenins thus obtained are identical with those secured as a result of cleavage by saponases from higher plants or by hydrochloric acid.
- 877 Lobunez, Walter (Univ. of Penna.; work done under Research and Marketing Act Contract).
THE DIPOLE MOMENTS AND STRUCTURES OF ORGANIC PEROXIDES AND RELATED SUBSTANCES.
Ph.D. Thesis, University of Pennsylvania, Philadelphia, Penna., 1954.
The electric dipole moments of di-*t*-butyl peroxide, *t*-butyl hydroperoxide, cumene hydroperoxide, perlauric acid and dibenzoyl peroxide have been measured in benzene at 30° C. The moments of the di-*t*-butyl peroxide, *t*-butyl hydroperoxide and perlauric acid were also measured at 50° C. These measurements represent the first reported values for cumene hydroperoxide and perlauric acid.
- The dependency of the polarization on concentration was studied in this work and has shown that the molecules of the solute peroxide are not associated at the studied concentrations.
- An improved procedure has been demonstrated for the determinations and calculations in dealing with small dipole moments.
- 878 Lothrop, R. E.
RESEARCH DEVELOPS NEW OUTLETS FOR HONEY. Gleanings in Bee Culture, vol. 82, p. 594-599, 635, October 1954.
This paper consists of a review of progress made in the research program on honey at the Eastern Utilization Research Branch since the program was initiated in 1948.

- 879 Mellon, E. F., Viola, S. J. and Hoover, S. R.
DETERMINATION OF AMIDE NITROGEN IN COLLAGEN AND OTHER PROTEINS. Journal of the American Leather Chemists Association, vol. 49, p. 710-719, November 1954.
An alkaline hydrolysis method for the determination of amide nitrogen is described. Values obtained by this method compare favorably with the literature values for a number of proteins. A study of the amide nitrogen content of collagen obtained from the hides of identical twin cattle subjected to different nutritional levels shows that the amide value of the collagen is independent of the nutritional history of the animals.
- 880 Peterson, R. F., McDowell, R. L. and Harrington, B. J.
CROSSBONDING OF CASEIN BRISTLE FIBER. Textile Research Journal, vol. 24, p. 747-753, August 1954.
A method is described for reducing the rate of water uptake of casein fibers and plastics. The method involves treating formaldehyde-hardened casein products with resorcinol and formaldehyde, drying, and heating. Optimum conditions for this treatment are described. The results indicate that resorcinol forms crossbonds with casein and formaldehyde.
- 881 Porter, William L. and Hoban, Nancy
ULTRAMICROTECHNIQUE FOR ENZYMATIC HYDROLYSIS OF SUGARS PRIOR TO CHROMATOGRAM ANALYSIS. Analytical Chemistry, vol. 26, p. 1846-1848, November 1954.
A method is presented, using melting point tubes for the enzymatic hydrolysis of 0.01 ml. samples containing 20 to 30 $\mu\text{g.}$ of carbohydrates, for use in the papergram examination of the products. The method allows prolonged hydrolytic periods without sacrificing the advantage of ultra-micro samples.
- 882 Porter, William L., Hoban, Nancy, and Willits, C. O.
CONTRIBUTION TO THE CARBOHYDRATE CHEMISTRY OF MAPLE SAP AND SIRUP. Food Research, vol. 19, p. 597-602, November-December 1954.
Fractionation of sterile maple sap by ion exchange and chromatographic techniques has shown maple sap to contain a mixture of oligosaccharides. Contrary to the literature, no hexose sugars were found. It was confirmed that slight microbial contamination of the sap quickly produced glucose and fructose which increased in quantity as the contamination increase. In addition to sucrose, at least five other oligosaccharides were demonstrated. Two of these compounds are trisaccharides, one of which has been identified as raffinose or a closely related compound and the other as a glucosyl sucrose.
- 883 Radell, Jack, Eisner, Abner and Donahue, E. T.
ISOLATION OF A NEW FRACTION FROM WOOL WAX ACIDS. Journal of the American Chemical Society, vol. 76, p. 4188-89, August 20, 1954.
A new fraction has been isolated from wool wax acids which corresponds to a delta lactone of molecular formula $\text{C}_{20}\text{H}_{38}\text{O}_2$.

- 884 Ricciuti, C., Willits, C. O., Ogg, C. L., Morris, S. G. and Riemenschneider, R. W.

FORMATION OF PEROXIDES IN FATTY ESTERS. II. METHYL LINOLEATE: APPLICATION OF THE POLAROGRAPHIC AND DIRECT OXYGEN METHODS.

Journal of the American Oil Chemists Society, vol. 31, p. 456-459, November 1954.

This manuscript presents the results obtained by the polarographic, chemical peroxide, direct oxygen, catalytic hydrogenation and iodine value methods applied to methyl linoleate samples subjected to autoxidation at 80°C. for periods up to 267 hours.

- 885 Riemenschneider, R. W.

ANALYTICAL METHODS AND COMPOSITION OF FATTY MATERIALS.

Journal of the American Oil Chemists Society, vol. 31, p. 517-523, November 1954.

Analytical methods and procedures useful in determining fatty acid and glyceride composition of fats and oils were discussed. Principal attention was given to a discussion of the essential features of ultraviolet spectrophotometric methods. Typical data obtained in fatty acid and glyceride analyses of some common fats and oils are presented.

- 886 Siedler, A. J. and Schweigert, B. S. (American Meat Institute Foundation, University of Chicago; work done under Research and Marketing Act Contract).

EFFECT OF FEEDING GRADED LEVELS OF FAT WITH AND WITHOUT CHOLINE AND ANTI-BIOTIC B₁₂ SUPPLEMENTS TO CHICKS. Poultry Science, vol. 32, p. 449-454, May 1953.

Calories from animal fat added to diet of chicks at 2 to 8% levels were efficiently utilized. Little or no advantage was observed for added choline or choline plus B₁₂.

- 887 Siedler, A. J. and Schweigert, B. S. (American Meat Institute Foundation, University of Chicago; work done under Research and Marketing Act Contract).

EFFECT OF THE LEVEL OF ANIMAL FAT IN THE DIET ON THE MAINTENANCE, REPRODUCTION AND LACTATION PERFORMANCE OF DOGS. Journal of Nutrition, vol. 53, p. 187-194, June 1954.

The maintenance, reproduction, and lactation performance of Cocker Spaniel dogs fed since weaning a basal ration with and without added fat were observed. The addition of 4 or 8 percent stabilized choice white grease increased the efficiency of the ration for maintenance of the females prior to breeding. On the basis of all performances studied, the results were excellent when 4 percent of the stabilized fat was added to the basal diet.

- 888 Sinnamon, H. I., Turkot, V. A., Eskew, R. K., and Phillips, G. W. M.

POWDER MAKES A-1 APPLE JUICE. Food Engineering, vo. 26, p. 78-79, 131-132, July 1954.

A pilot-plant process for preparing a powdered apple juice product is described. High-density, full-flavor, sweetened and acidified apple juice concentrate is dried in a vacuum tray drier to a moisture content below 3 percent. The dried material is ground to a coarse granular powder and packaged with a desiccant to prevent caking during storage. A beverage prepared from the powder has an excellent fresh flavor which closely resembles that of the beverage prepared from the high-density, full-flavor concentrate.

- 889 Steyermark, Al., Alber, H. K., Aluise, V. A., Huffman, E. W. D., Jolley, E. L., Kuck, J. A., Moran, J. J., and Ogg, C. L. and Willits, C. O. (EURB), (Committee for the Standardization of Microchemical Apparatus, Division of Analytical Chemistry. American Chemical Society).
1953 REPORT ON RECOMMENDED SPECIFICATIONS FOR MICROCHEMICAL APPARATUS, WEIGHING AND DRYING. Analytical Chemistry, vol. 26, p. 1186-90, July 1954.
The Committee's report includes specifications for micro weighing and drying equipment including boats, weighing bottles, spatulas, forceps, tare bottles and a modified Abderhalden dryer.
- 890 Stirton, A. J.
FAT-BASED SURFACE-ACTIVE AGENTS. Journal of the American Oil Chemists Society, vol. 31, p. 579-586, November 1954.
A review of the chemistry and uses of anionic, cationic and nonionic surface active agents based on inedible fats and fatty acids.
- 891 Swern, Daniel
PLASTICIZERS. Journal of the American Oil Chemists Society, vol. 31, p. 574-578, November 1954.
External and internal plasticization are discussed. Specific plasticizers for polyvinyl chloride are described. The use of fats for external and internal plasticization is also discussed.
- 892 Wall, Monroe E., Eddy, C. Roland, and Williman, J. J. (EURB), Correll, D. S., Schubert, B. G. and Gentry, H. S. (Horticultural Crops Research Branch).
STEROIDAL SAPOGENINS. XII. SURVEY OF PLANTS FOR STEROIDAL SAPOGENINS AND OTHER CONSTITUENTS. Journal of the American Pharmaceutical Association, Sci. Ed., vol. 43, p. 503-505, August 1954.
This is a report on the results of the chemical examination of the second 1000 plant samples received in a survey of plants for steroidal sapogenins. Data are given on 997 samples, representing 598 identified species, 201 unidentified lots, 392 genera and 129 families. Quantitative data are given for the occurrence of 11 steroidal sapogenins. Qualitative results are given for flavonols, alkaloids, tannins and unsaturated sterols.
- 893 Wall, Monroe E., Eddy, C. Roland, and Willaman, J. J. (EURB), Correll, D. S., Schubert, B. G. and Gentry, H. S. (Horticultural Crops Research Branch).
STEROIDAL SAPOGENINS. XV. SUPPLEMENTARY TABLE OF DATA FOR STEROIDAL SAPOGENINS XII. AIC-367, June 1954. (Processed).
A table of data supplementary to Steroidal Sapogenins XII. It covers the second 1000 plant accessions received in the search for steroidal sapogenins. It gives the identification and origin of the samples, the results of hemolysis tests for saponins, the kinds and amounts of steroids, and qualitative findings for flavonols, alkaloids, tannins and sterols.
- 894 Weil, J. K., Stirton, A. J. and Bistline, R. G., Jr.
SYNTHETIC DETERGENTS FROM ANIMAL FATS. THE SULFATION OF TALLOW ALCOHOLS. Journal of the American Oil Chemists Society, vol. 31, p. 444-447, November 1954.
The mono-unsaturated tallow alcohols, oleyl and elaidyl alcohol, were sulfated with modified sulfating agents, complexes of either sulfur trioxide, chlorosulfonic acid, or sulfuric acid. Reaction involving the double bond was minimized and the products were good detergents and surface active agents, easily soluble at room temperature.

895 White, Jonathan W., Jr.

PROGRESS IN HONEY UTILIZATION. Florida State Beekeepers Association Proceedings, p. 54-60, 1953.

A non-technical description of the honey utilization research program at the Eastern Regional Research Laboratory. The work described includes flavor modification of low-grade honey, honey-fruit spreads, concentrated honey-milk products, the role of honey in commercial baking, and cooperative analytical work on tupelo honey.

896 White, Jonathan W., Jr. (EURB) and Sturtevant, A. P. (Entomology Research Laboratory, Laramie, Wyoming).

STERILIZATION OF HONEY FOR BEE FEEDING. Gleanings in Bee Culture, vol. 82, p. 658-661, November 1954.

Honey infected by the spores of American foulbrood can be sterilized by open-kettle boiling, as shown by feeding tests with six bee colonies.

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Patents

COPIES OF PATENTS MAY BE PURCHASED FROM

THE UNITED STATES PATENT OFFICE, WASHINGTON 25, D. C.

Filachione, Edward M.; Beebe, Clarence W.; Harris, Edward H., Jr. and
Luvisi, Fred P.

PURIFICATION OF CANAIGRE TANNIN WITH AQUEOUS METHYL ETHYL KETONE. U. S.
Patent No. 2,694,725, issued November 16, 1954.

Wall, Monroe E. and Krider, Merle M.

ENZYMATIC HYDROLYSIS OF STEROIDAL SAPONINS. U. S. Patent No. 2,686,752,
issued August 17, 1954.

Index to publications listed in ARS-73-6, AIC-180 and Supplements 1 through 6, and AIC-320 and Supplements 1 through 6 (1939 through December, 1954). The numbers refer to the numbers of the publications in the lists; for those with an asterisk, reprints were not available at the time the index was prepared.

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